Scribner Papers at Princeton University Library. The largest collection of her (mostly early) letters is in the William R. Perkins Library at Duke University. A collection of the letters of Albert Payson Terhune and the daybook diaries of Edward Payson Terhune, both at the Alexander Library, Rutgers University, also shed light on Terhune's life and career. Hawes family papers are at the Virginia Historical Society, Richmond.

The *National Union Catalogue* has a fairly comprehensive list of Terhune's seventy books. Terhune's *Marion Harland's Autobiography* (1910) is a good source, as is Mary Hudson Wright, "Mary Virginia Hawes Terhune ("Marion Harland"): Her Life and Works" (Ph.D. diss., George Peabody College for Teachers, 1934). See also Karen Manners Smith, "Marion Harland: The Making of a Household Word" (Ph.D. diss., Univ. of Massachusetts, 1990). The notes and bibliographies in these two sources will lead to most extant biographical sources on Terhune, including articles about her dating from the 1850s to the 1920s. A brief sketch by her grandson, Frederic Franklyn Van de Water, remains unpublished.

Among secondary works that include discussions of Terhune see Nina Baym, *Woman's Fiction: A Guide to Novels By and About Women in America 1820–1870* (1978); Mary Kelley, *Private Woman, Public Stage: Literary Domesticity in Nineteenth-Century America* (1984); Glenna Matthews, *Just a Housewife: The Rise and Fall of Domesticity in America* (1987); and Elizabeth Moss, *Domestic Novelists in the Old South: Defenders of Southern Culture* (1992). An obituary is in the *New York Times*, 4 June 1922.

KAREN MANNERS SMITH

TERMAN, Frederick Emmons (7 June 1900–19 Dec. 1982), electrical engineer and educator, was born in English, Indiana, the son of Lewis M. Terman, a psychologist, and Anna Minton. He grew up on the campus of Stanford University, where his father, an expert on mental testing, taught psychology. Intellectually precocious, Terman tested at the genius level on the Stanford-Binet intelligence scale that his father had devised, and was one of the subjects in his father's famous study of gifted children. Terman's parents, convinced that conventional education only stifled the truly gifted, taught him at home until the age of nine. Terman then excelled in school, skipping grades and graduating at the top of his Stanford class in 1920 with a degree in chemical engineering. Switching to electrical engineering, he earned a master's degree under Harris Ryan, chairman of Stanford's department and a specialist in high voltage power systems.

At Ryan's urging, Terman completed his education at the Massachusetts Institute of Technology. His doctorate, received under Vannevar Bush, was only the eighth awarded by MIT in electrical engineering. Upon graduation in 1924, he was offered a teaching position there but suffered a bout of tuberculosis and returned home to recuperate. While he was regaining his strength, he began teaching electrical engineering part time at Stanford and in 1926 accepted a full-time appointment.

Terman's ambition was to remake Stanford's electrical engineering program in the image of MIT's. With the exception of Ryan's high voltage research, Terman considered Stanford's department second rate. He decided to concentrate on the emerging field of radio and communications. Following MIT's approach, Terman drew his own research problems (mostly on vacuum tube designs) from industry and encouraged active collaboration between his students and local electronics companies. His first textbook, *Radio Engineering* (1932), reflected this commercial bent and became an immediate bestseller because, like his courses, it presented real-world problems with elegance and simplicity. Terman never took time off to write this or any of his texts. He set himself instead the deceptively easy goal of writing one page a day, and in that way turned out a full shelf of books.

Outside the laboratory and the classroom Terman was a loner, self-absorbed and painfully awkward in social situations. Finding it difficult to meet women on his own, he turned to his father, whose assistants searched through mental testing files for suitable matches. The senior Terman arranged for him to meet psychology graduate student Sibyl Walcutt, whom Terman married in 1928; they had three sons.

After Ryan's retirement in 1932, Terman began attracting more electrical engineering graduate students than any other Stanford professor. In 1937 he advanced to full professor and department head. Looking to strengthen the local electronics industry, Terman encouraged his best graduates to stay in the Palo Alto area. He lured former student David Packard back from General Electric by arranging a special fellowship and put him to work with another top prospect, William Hewlett. In 1939 Terman supplied Hewlett and Packard with an idea and the modest financial backing to start Hewlett-Packard, which grew into one of the largest electronics companies in the world. In 1941 the Institute of Radio Engineers recognized Terman's accomplishments as researcher, teacher, and program builder by electing him president.

At the arrangement of Vannevar Bush, then serving as head of the wartime National Defense Research Committee, Terman spent World War II heading the Radio Research Laboratory, a spinoff of MIT's Radiation Laboratory, which was devoted to electronic countermeasures and housed at Harvard. Terman brought as many as thirty Stanford students and colleagues to RRL, and together they received a practical education in the art of microwave engineering. Under Terman's leadership, RRL developed a number of important devices for locating and jamming enemy radar. At its peak, RRL had 744 employees and industrial contracts worth $300 million. Terman's record at RRL earned him the U.S. Medal of Merit.

Returning to Stanford in 1946 as dean of engineering, Terman brought a new agenda for engineering education. His wartime experiences had convinced him that electrical engineers needed more rigorous scientific training to keep pace with the physicists, who had contributed most of the important innovations in defense electronics. Advocating an undergraduate curriculum that was grounded in basic sciences and mathematics, Terman implemented this program not only

at Stanford but, through his committee work for the IRE, across the country as well.

Having seen what government contracts had done for the universities that had received them during World War II, Terman had no intention of letting the scientific spoils of war slip through his fingers and became determined to make Stanford a topnotch research university. Recognizing that Stanford could not hope to match such powerful rivals as MIT in every science and engineering field right away, Terman developed a "steeple building" strategy that concentrated on creating top programs in a few crucial areas rather than trying to cover every specialty. Better one seven-foot high jumper on the team than lots of six-footers, Terman liked to say.

From Terman's perspective, microwave electronics was clearly the most promising niche for postwar Stanford. The electronics veterans returning with him from RRL and other wartime laboratories had both the necessary experience and the industrial and military contacts to position them for success. In 1947 Terman founded the Stanford Electronics Laboratories, which rapidly grew into a nationally recognized center for studies in the theory and practice of microwave technology. From the start, virtually all of its funding came from defense contracts with federal agencies such as the Office of Naval Research. Terman kept in touch with changing military priorities through the technical advisory committees, notably the Institute for Defense Analysis, on which he served. SEL doubled in size during the Korean War, adding applied and classified research programs in electronics countermeasures and advanced radar design. As a consequence of SEL's success, Stanford had climbed to sixth place among university defense contractors by the mid-1950s and, in the area of electronics, could match MIT in academic reputation and in the annual number of graduate degrees.

As dean and director of SEL, Terman encouraged collaboration between academic and industrial research. Although SEL did not as a rule develop electronic devices beyond the prototype stage, part of its understanding with its military sponsors was that it would work closely with industrial firms that did. Faculty members consulted for these companies, and corporate engineers spent time at SEL. To further these informal connections, Terman initiated a program in which local high-technology companies sent their best young engineers on a part-time basis to Stanford to earn advanced degrees. The university got first-rate students, and industry got better-trained engineers and a direct pipeline to Stanford research.

Terman was also instrumental in creating the Stanford Industrial Park, one of the earliest and most successful efforts to foster academic-industrial cooperation. Varian Associates, a firm founded by several former Terman students, became the park's first tenant in 1951, followed by Hewlett-Packard, and other firms. Stanford had become so prominent in microwave electronics that corporations such as Sylvania, General Electric, Admiral, and Zenith set up laboratories nearby. By 1960 the Stanford Industrial Park had twenty-seven tenants, many of them spinoffs of university laboratories, such as Watkins-Johnson, or headed by recent Stanford graduates, such as GE's Microwave Laboratory. Terman's success in attracting high technology firms to the region earned him unofficial designation as "the father of Silicon Valley." Serving on the boards of directors of a number of these companies, Terman became something of an expert on investment in high technology.

Named provost in 1955, Terman expanded his steeple building to the entire university. Bringing in faculty members with connections to the aerospace industry, he revitalized the languishing aeronautics program. The massive government contracts that it brought in made Stanford a leader in high-speed structures, guidance and control, gas dynamics, and other space age specialties. Terman pushed hard for the Stanford Linear Accelerator Center. Completed in 1966, it was the biggest (two miles long), most powerful (20 GeV), and most expensive ($114 million) scientific instrument of its day and made Stanford one of the world's centers for high-energy physics. Terman then turned his attention to the social sciences and humanities. With the support of President Wallace J. E. Sterling, he appointed distinguished scholars and program builders, and Stanford earned national recognition in these fields as well.

Terman took a hands-on approach to academic administration. He appointed new faculty members, created new programs, and closed old ones, often without consulting the faculty. His high-handedness infuriated a number of professors, as did his obsession with quantification when it took the form of cost accounting as applied to particular programs and departments. Rarely losing battles with his faculty, he considerably strengthened the power of the university's central administration at the cost of departmental and faculty autonomy.

After his retirement in 1965, Terman became a well-paid consultant on the creation of mutually sustaining partnerships of research universities and high technology industry. Corporate consortia from New Jersey and Texas hired him to teach them the secrets of Silicon Valley, as did representatives from South Korea and Taiwan.

Elected to the National Academy of Sciences in 1946, Terman was a founding member in 1964 of the National Academy of Engineering and won the National Medal of Science in 1976. He died at home on the campus of Stanford University.

• Terman's extensive papers are in the Stanford University Archives. His major texts are *Radio Engineering* (1932), *Radio Engineers' Handbook* (1943), *Electronic Measurements* (1952), and *Electronic and Radio Engineering* (1955). Henry L. Minton, *Lewis M. Terman: Pioneer in Psychological Testing* (1988), and Joel N. Shurkin, *Terman's Kids: The Groundbreaking Study of How the Gifted Grow Up* (1992), provide some fascinating insights into Terman's childhood and character. The IEEE History Center at Rutgers University has a small but important collection of oral history interviews with

Terman's former colleagues. For sketches of his career, see A. Michal McMahon, *The Making of a Profession: A Century of Electrical Engineering in America* (1984); Effie G. Bryson, "Frederick E. Terman: Educator and Mentor," *IEEE Spectrum* (Mar. 1984): 71–73; and James C. Williams, "Frederick E. Terman and the Rise of Silicon Valley," in *Technology in America: A History of Individuals and Ideas*, ed. Carroll W. Pursell, Jr. (1990), pp. 276–91. Rebecca Lowen, "Transforming the University: Administrators, Physicists, and Industrial and Federal Patronage at Stanford, 1939–49," *History of Education Quarterly* 31 (Fall 1991): 365–86, offers a perceptively critical look at Terman's empire-building strategies, as does her "Exploiting a Wonderful Opportunity: Stanford University, Industry, and the Federal Government, 1937–1965" (Ph.D. diss., Stanford Univ., 1990). Stuart W. Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford* (1993), includes chapters on Terman and electronics engineering at Stanford.

STUART W. LESLIE

TERMAN, Lewis Madison (15 Jan. 1877–21 Dec. 1956), psychologist, was born in Johnson County, Indiana, the son of James William Terman and Martha Cutsinger, farmers. From 1892 to 1898 Terman attended Central Normal College in Danville, Indiana, where he earned baccalaureate degrees in pedagogy, science, and classics. From 1894 to 1898, on an intermittent basis, he was a schoolteacher, and from 1898 to 1901 he was a high school principal. In 1899 Terman married Anna Belle Minton; they had two children. In order to prepare for teaching psychology or pedagogy at the college level, he attended Indiana University from 1901 to 1903 and earned an A.B. and an A.M. in psychology. His mentor at Indiana was Ernest H. Lindley, who had been trained by G. Stanley Hall, one of the leading psychologists in the development of the discipline in the 1880s and 1890s. In 1903 Terman began doctoral work in psychology with Hall at Clark University and obtained a Ph.D. in 1905.

Upon completion of his graduate studies, Terman was a high school principal for one year in San Bernardino, California. From 1906 to 1910 he taught child study and pedagogy at the Los Angeles State Normal School. In 1910 he received an appointment in the education department at Stanford University, where he spent the rest of his career. At Stanford he followed up on his doctoral research interests in mental testing. An ardent proponent of the supremacy of nature over nurture in the determination of intelligence, he engaged in a number of published nature-nurture debates throughout his career. His first major research project was the development of an American version of the French scientist Alfred Binet's 1905 scale of intelligence. In 1916, with the collaboration of his graduate students, Terman published an extensive revision, which became known as the Stanford-Binet Scale. The first to make use of the "Intelligence Quotient," or "IQ," this measure became the most widely used test of intelligence. Terman revised the Stanford-Binet with Maud A. Merrill in 1937.

The success of the Stanford-Binet brought Terman professional acclaim. In 1917 he played a key role in the development of army intelligence tests. Known as the Alpha and Beta examinations, these tests were group-administered versions of the Stanford-Binet that enabled large numbers of individuals to be tested at one time. After the war, Terman endeavored to adapt the army's group-testing methods to the schools. In collaboration with a committee of psychologists who had worked on the army tests, he developed the "National Intelligence Tests" for grades three to eight, which were ready for use in 1920. Throughout the 1920s, he played a leading role in establishing the widespread use of various group intelligence tests in schools so that students could be classified into homogeneous ability groups, in what became termed a tracking system. Drawing on the social implications of ability grouping, Terman argued that "the classification of school children according to ability . . . [is] absolutely essential if the public school is to be made a real instrument of democracy. . . . Reclassification of children . . . will go far toward insuring that every pupil . . . shall have a chance to make the most of whatever abilities nature has given him" (Virgil E. Dickson, *Mental Tests and the Classroom Teacher* [1923], pp. xiv–xv).

In 1922 Terman became head of Stanford's psychology department. The previous year he had launched a large-scale longitudinal study of gifted children, which he considered to be his most significant professional accomplishment. Because the gifted, according to Terman, were the potential leaders of society, it was essential to identify highly intelligent children and ensure that they would be exposed to optimal intellectual environments. The sample that Terman studied consisted of approximately 1,500 elementary and high school students in California with IQ scores of at least 135. His purpose was to identify and describe gifted children and eventually follow up their development. In a 1925 book that reported the results of the study, Terman concluded that gifted children had the kind of well-rounded personalities and skills that, given the opportunity, could be harnessed for leadership roles. He reported the results of the follow-up in 1930, 1947, and posthumously in 1959. In 1948 he made arrangements for the gifted follow-up to continue after his death, and under the direction of Robert Sears, who joined Stanford's faculty in 1953, follow-ups continued through the 1980s. Overall, the study demonstrated that the gifted sample achieved career success well above the average of college graduates and attained a high degree of personal satisfaction.

Terman's many other research endeavors included the development of the first comprehensive group-administered achievement test (the Stanford Achievement Test) in 1923, and a paper-and-pencil test of masculinity-femininity that assessed gender identity in 1936. In the 1930s he began to study marital adjustment. After his retirement in 1942, Terman remained active in research and writing until his death in Palo Alto, California.